ONTARIO. MINISTRY OF THE ENVIRONMENT

SNOW SAMPLING SURVEY IN THE VICINITY
OF A SECONDARY TREATMENT SYSTEM
OPERATED BY GREAT LAKES FOREST PRODUCTS
LIMITED, DRYDEN

1985

SNOW SAMPLING SURVEY
in the vicinity of a
SECONDARY TREATMENT SYSTEM
operated by
GREAT LAKES FOREST PRODUCTS LIMITED, DRYDEN

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INTRODUCTION

Great Lakes Forest Products Limited operates a kraft pulp mill in the Town of Dryden. A secondary treatment system, completed in August, 1983, treats liquid waste from the mill before discharging the effluent into the Wabigoon River. In the spring of 1984, complaints were received from area residents that the lagoon was the source of blowing foam and offensive odours which were causing adverse health effects.

A Ministry of the Environment report issued in February, 1985 (1) found that no conclusions could be reached concerning health effects of windborne foam. The report also noted that there were elevated concentrations of sodium and chloride in moss experimentally exposed around the lagoon, but that these elevated readings were restricted to company property.

To determine whether snow chemistry was being affected by airborne emissions from the secondary treatment system during winter months, a snow sampling survey was conducted in February, 1985.

METHODS

Single samples of snow were collected February 1, 1985 from 14 sites near the treatment system (Figure 1) and from two control sites remote from the study area. Core samples of the complete snow profile were obtained following standard Ministry sampling procedures (2). Snow meltwater samples were submitted to the Ministry's Thunder Bay Laboratory for determination of calcium, sodium, chloride, sulphate, mercury, conductivity and pH. Analysis of carbon, residues (solids) and tannins was performed at the Ministry's Toronto laboratory.

RESULTS

Chemical analysis results are presented in Table 1. Levels of all parameters tested were low at all sites and were within expected background ranges. The highest levels of calcium, chloride and sodium occurred along roadways in the area, probably as a result of the use of mixtures of sand and salt for winter road maintenance. Between the date when a permanent snow cover was established (November 28) and the date of the survey, no above-freezing temperatures were recorded at the Dryden Airport. This absence of thaw conditions suggests that there was probably no significant loss of chemical constituents from the snow up to the date of the sampling. Sample core depth averaged 43 cm (centimetres) and ranged from 28 to 54 cm. No visible particulate matter was noted on the snow surface or within the snow profile at any sampling point.

On the date of our survey, very little foam was present in the ice-free aeration basin, and there was no windborne foam. A narrow ledge of ice was present along the perimeter of the aeration lagoon. No sprayers were in use at this time but aerators were operating.

DISCUSSION AND CONCLUSIONS

Snow samples collected in February from 14 sites near the Great Lakes aeration system showed no evidence of contamination. This finding suggests that operation of the lagoon under winter conditions does not lead to contaminant fallout either on or off company property. Similar results were found in a snow survey conducted in 1981 near Boise Cascade's aeration lagoon in Fort Frances (3).

REFERENCES

1. Griffin, H. D. 1985. Report on foam and odours from the secondary treatment system operated by Great Lakes Forest Products Limited, Dryden. Northwestern Region, Ontario Ministry of the Environment.

2. Ontario Ministry of the Environment. 1983. Field investigation procedures manual, Phytotoxicology Section, Air Resources Branch, Toronto.

3. Racette, D. J. and H. D. Griffin. 1982. Air quality studies in the vicinity of the secondary treatment system, Boise Cascade Canada Limited, Fort Frances. Northwestern Region, Ontario Ministry of the Environment.

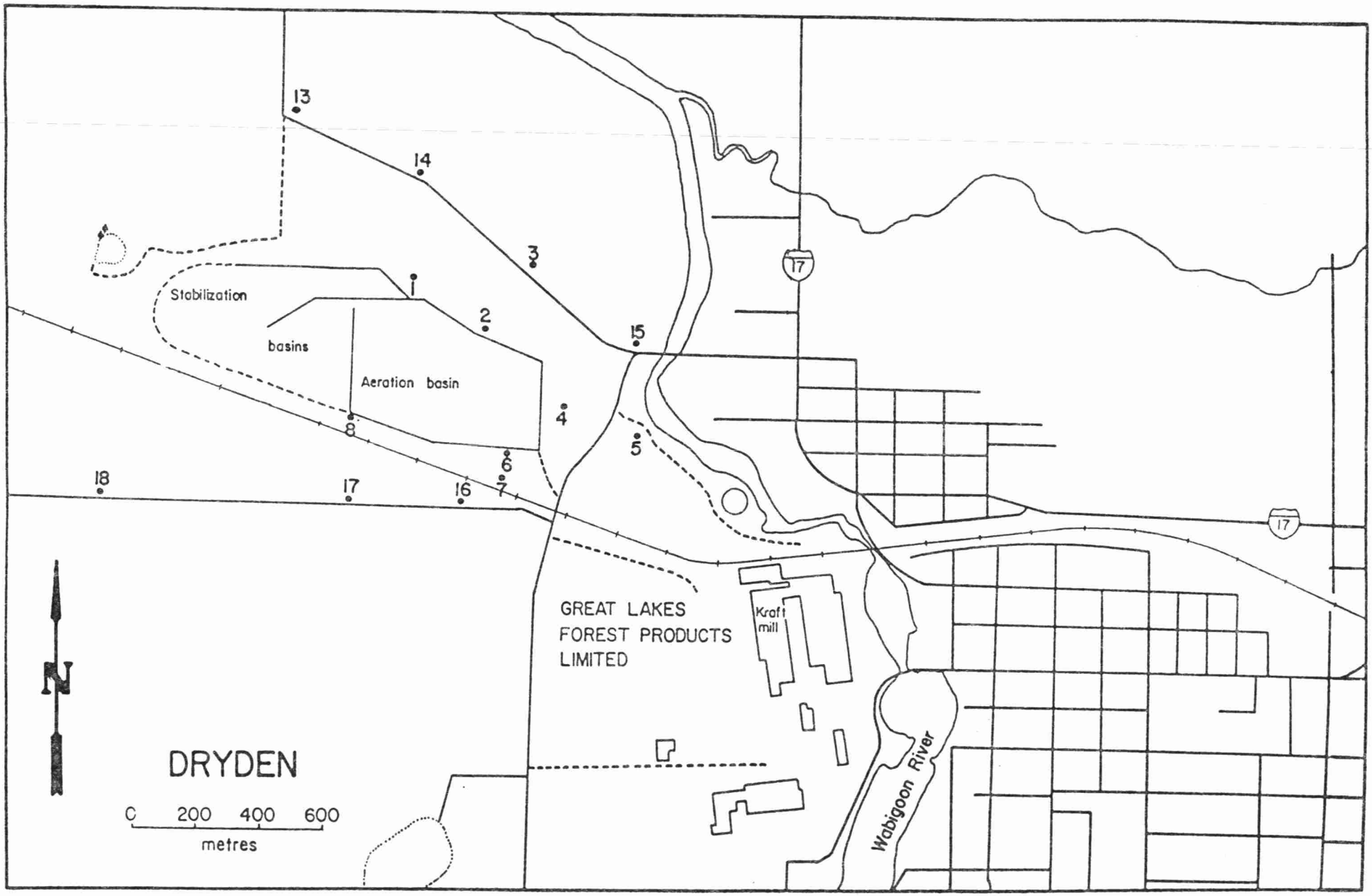

Figure 1. Snow sampling sites, Dryden, 1985.

TABLE 1. Levels of calcium, sodium, mercury, chloride, and sulphate (µg/ℓ); carbon, tannins, and residues (mg/ℓ); conductivity (µmhos/cm), and pH in snow in the vicinity of Great Lakes Forest Products Limited secondary treatment system, Dryden, February, 1985.

Station	Calcium	Sodium	Mercury	Chloride	Sulphate	Carbon		
						Dissolved inorganic	Dissolved organic	Total particulate
1	870	570	<0.05	300	1200	0.6	0.5	1.4
2	730	520	<0.05	300	1100	1.0	0.5	1.7
3	650	1900	<0.05	2400	1000	1.0	0.4	1.9
4	930	830	<0.05	800	1200	0.8	0.9	1.5
5	930	910	<0.05	1000	1000	0.8	0.4	2.1
6	950	1100	<0.05	400	1700	0.8	1.5	2.1
7	690	740	<0.05	500	1600	1.2	1.3	3.3
8	430	440	<0.05	200	980	1.6	0.4	1.0
13	450	1100	<0.05	1300	980	1.2	0.5	1.2
14	630	960	<0.05	1200	780	0.6	0.5	1.4
15	980	870	<0.05	700	1000	0.8	0.6	2.4
16	670	610	<0.05	500	1200	0.6	0.9	1.9
17	450	400	<0.05	300	810	0.4	0.6	1.8
18	390	470	<0.05	400	880	0.4	0.7	1.8
Controls	240	300	<0.05	300	600	0.6	0.6	1.2
Proposed guideline[a]	2000	2000	0.1	4000	3000			

[a] Exceedence of guidelines suggests that contamination is present, but does not necessarily imply an adverse effect.

TABLE 1. Cont'd.

Station	Tannins	Residue			Conductivity	pH
		Filtrate[b]	Particulate[c]	Total		
1	0	14.0	3.4	17.4	8	6.6
2	0	<0.5	4.6	<5.0	8	6.4
3	0	4.0	6.4	10.4	15	6.7
4	0	6.0	5.4	11.4	11	6.5
5	0		6.1	<6.2	10	6.7
6	0	16.0	5.7	21.8	13	6.8
7	0	46.0	8.2	54.2	10	6.1
8	0	6.0	2.7	8.6	6	6.2
13	0	10.0	3.7	13.6	10	5.9
14	0	4.0	4.8	8.8	9	6.2
15	0	2.0	7.2	9.2	11	6.8
16	0	8.0	5.7	13.8	8	6.3
17	0	<0.5	5.3	<5.8	6	6.1
18	0	<0.5	3.5	<4.0	6	5.9
Controls	0	6.0	3.9	9.8	6	5.4
Proposed guideline[a]			30		60	

[a] Exceedence of guidelines suggests that contamination is present, but does not necessarily imply an adverse effect.
[b] Formerly reported as dissolved solids.
[c] Formerly reported as suspended solids.

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